

Application No. 10/584,867
Paper Dated: April 14, 2010
In Reply to USPTO Correspondence of December 18, 2009
Attorney Docket No. 0262-061920

REMARKS

This application has been amended. In particular, claim 21 has been amended to incorporate therein the limitations previously appearing in claims 28 and 29 and to modify the long-chain polyunsaturated fatty acid weight percent range. Support for these amendments can be found in the originally-filed application, such as at page 3, lines 17-22, page 4, lines 6-9, page 4, lines 16-19, and claims 6 and 7. Additional amendments have been made to claim 21 to correct certain antecedent basis inconsistencies. Claim 30 has also been amended, and support for these amendments can be found in the same passages of the originally-filed application as discussed above with respect to claim 21. Claims 25, 28 and 29 have been cancelled.

The specification has also been amended to insert numerical weight percent values for Example 1 that were inadvertently omitted. Support for this amendment can be found in Table 1. As explained in Table 2, “DPA” is equivalent to 22-5 ω 3 and “DHA” is equivalent to 22-6 ω 3.

Claims 21, 23, 24, 26, 27 and 30 are pending. Claims 21 and 30 are in independent form. For the following reasons, the pending claims are believed to be patentable over the cited art of record.

Rejections Based on Akimoto

Claims 21, 24-25 and 29 stand rejected under 35 U.S.C. §103(a) for obviousness over Akimoto (EP 0775449) in view of Rombauer (Joy of Cooking, pg. 220). This rejection is respectfully traversed.

Akimoto describes fowl eggs in which the concentration of certain long-chain polyunsaturated fatty acids is supposedly increased through the use of supplemental feed provided to the fowl. In particular, Akimoto describes the results of a test in which a first group of chickens was fed with ordinary feed while a second group of chickens was fed with a feed supplemented with ω 6 highly unsaturated fatty acids. (Akimoto, pg. 7, lines 6-26.)

The eggs produced by each group of chickens in Akimoto were analyzed. The analysis method appears to include extracting portions of the lipid from the yolk through a solvent extraction method. (Akimoto, pg. 5, lines 52 – page 6, line 11.) The solvent used in the

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examples for extraction was ethanol. (Akimoto, pg. 7, line 7.) The egg weight, yolk weight, extracted oil weight, percent of arachidonoic acid to total fatty acids, percent of eicosapentaenoic acid to total fatty acids, and ratio of docosahexaenoic acid to total fatty acids were reported in the various tables.

The present invention is directed to a solid fat product based on whole egg or egg yolk. The product includes a fat or oil component and a non-fat component. The fat or oil component includes long-chain polyunsaturated fatty acids having at least 20 carbon atoms in an amount of 10 to 70 wt.% of the total fatty acid content. At least part of the fat or oil component originates from a fat or oil component selected from the group consisting of an animal fat, fish oil, marine animal oil, fermentation oil, single-cell oil and mixtures thereof. The solid fat product has a fat or oil content of more than 30 wt.% based on the fat product dry matter.

The differences in the product of Akimoto and the product claimed in claim 1 is perhaps better understood by first looking at the clear differences in the manner in which each is produced. In Akimoto, the enhanced eggs are produced simply by feeding the chickens a different feed. In the subject application, however, the product is produced by replacing the endogenous fat component of the egg with a fat or oil component containing triglycerides and/or phospholipids of long-chain polyunsaturated fatty acids so as to achieve the claimed features. (See page 6, lines 1-9 of as-filed application.) Moreover, at least part of the replacement fat or oil component originates from a fat or oil component selected from animal fat, fish oil, marine animal oil, fermentation oil, single-cell oil and mixtures thereof. Thus, Akimoto is directed to an egg produced by a chicken given modified feed while the present application is directed to an entirely different product altogether, and namely a product in which the egg oil is separated from the egg and replaced with a fat or oil component containing long-chain polyunsaturated fatty acids, at least part of which originates from a list of defined sources.

As admitted in the Office Action, Akimoto does not discuss an egg product that is solid. To correct this deficiency, the Office Action cites the Rombauer article to suggest it would be obvious to hard boil the eggs of Akimoto. It is asserted that hard boiling the eggs would create a solid fat product. However, Applicants note that claim 1 requires a solid fat product that has a fat or oil content of more than 30 wt.%, based on the fat product dry matter. Table 48 in

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the Potter Food Science article cited in the Office Action seems to suggest that the fat content of a hard boiled egg is far below this 30 wt.% value.

Moreover, Akimoto does not disclose a product in which at least part of the fat or oil component originates from a fat or oil component selected from the group consisting of an animal fat, fish oil, marine animal oil, fermentation oil, single-cell oil and mixtures thereof. As discussed above, the product in Akimoto is, simply put, an egg as produced by the chicken without any foreign fat or oil components added thereto. On the other hand, the claims require a fat product in which at least part of the fat or oil component of the fat product originates from the fat or oil component of a select group. This represents another deficiency of Akimoto.

Furthermore, the relative amount of long-chain polyunsaturated fatty acids having at least 20 carbon atoms in the eggs of Akimoto does not amount to 10 to 70 wt.% of the total fatty acid content. As described above, the yolks of the eggs of Akimoto undergo an extraction procedure using ethanol. Ethanol solvent extraction does not lead to an equal extraction of all lipids contained in the egg yolk because ethanol is a particularly polar solvent that preferably extracts polar lipids, i.e., phospholipids. Therefore, the egg lipids analyzed in the Examples portion of Akimoto are rich or dominant in phospholipids, and phospholipids are known to contain a higher proportion of long-chain polyunsaturated fatty acids having at least 20 carbon atoms than the fatty acids present in the form of triglycerides. In other words, the percentages of, e.g., arachidonic acid and docosahexaenoic acid shown in the tables of Akimoto do not reflect an accurate ratio of the total fatty acid ratio in the egg. Rather, based on the extraction performed, the reported ratio is the fatty acid ratio in the extracted lipid oil portion, not the ratio of the total fatty acid content of the whole egg or egg yolk.

Therefore, a hard boiled Akimoto test egg would not constitute a solid fat product as defined in claim 21. Accordingly, Applicants respectfully submit that the rejection of claims 21, 24-25 and 29 under 35 U.S.C. §103(a) for obviousness over Akimoto in view of Rombauer should be reconsidered and withdrawn.

Claims 26 and 27 stand rejected under 35 U.S.C. §103(a) for obviousness over Akimoto in view of Rombauer and further in view of Remacle (U.S. Patent App. Pub. No. 2004/002292). Claims 26 and 27 depend from claim 21. As explained above, claim 21 is not

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obvious over Akimoto in view of Rombauer. Ramacle is cited for its discussion on carbohydrate content. Thus, Remacle does not cure the above-discussed deficiencies of the Akimoto/Rombauer combination. Accordingly, the rejection of claims 26 and 27 should also be withdrawn.

Claim 28 stands rejected under 35 U.S.C. §103(a) for obviousness over Akimoto in view of Rombauer and further in view of Theuer (U.S. Patent No. 6,579,551) taken with Potter (Food Science, pg. 417). Theuer is cited as allegedly teaching that the composition of a dried egg yolk has a fat content of about 50%. However, it is unclear how the combination of Rombauer and Theuer would meet the limitation previously appearing in claim 28 (now in claim 21). The Office Action has asserted the fat product of claim 21 is achieved by hard boiling one of the whole eggs of Akimoto. Potter shows that the fat content of such a hard boiled egg falls far below 30 wt.% based on the total weight of dry product. Theuer confirms this to be true, as the fatty acid content of a whole egg is below 10 wt.%. Moreover, Theuer also fails to teach or suggest a fat product having a fat or oil component in which at least part of the fat or oil component is selected from the group consisting of an animal fat, fish oil, marine animal oil, fermentation oil, single-cell oil and mixtures thereof.

Thus, the combination of Akimoto in view of Rombauer and further in view of Theuer taken with Potter does not render obvious the invention previously appearing in claim 28.

Claims 21 and 23 stand rejected under 35 U.S.C. §103(a) for obviousness over Akimoto in view of Hagiwara (U.S. Patent No. 6,358,554). This rejection is traversed.

The deficiencies of Akimoto are discussed above. Applicants additionally note that the limitations of claims 28 and 29 have now been incorporated into claim 21. Neither claim 28 nor claim 29 was rejected over the Akimoto/Hagiwara combination. Thus, it is believed this amendment should be withdrawn.

Rejection Based on Melnick

Claims 21, 23-25, 28 and 30 stand rejected under 35 U.S.C. §103(a) for obviousness over Melnick (U.S. Patent No. 3,594,183) as further evidenced by Potter and Swern (Baileys Industrial Oil and Fat Products, pg. 366). This rejection is traversed.

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Melnick describes egg yolk-containing products that are produced by mixing defatted egg yolk solids with vegetable oil (preferably corn oil), salt, emulsifiers and coloring compounds and spray drying the emulsified and pasteurized mixture to obtain substantially dry, discrete particles of refatted egg yolk solids. (Melnick, col. 1, lines 13-20; col. 4, lines 22-30). The defatted egg yolk solids used in Melnick are prepared by extracting dried egg yolk solids with a non-polar solvent, preferably an aliphatic hydrocarbon solvent, to remove the fat and cholesterol. (Melnick, col. 4, lines 68-72).

Initially, Applicants note that the limitation of claim 29, which was not rejected based on the combination of Melnick, Potter, and Swern, has now been incorporated into claims 21 and 30. For this reason alone, it would appear this rejection has been overcome. However, Applicants wish to point out the additional defect in the rationale supporting this rejection.

Specifically, Melnick does not teach or suggest a product having a fat or oil component that includes long-chain polyunsaturated fatty acids having at least 20 carbon atoms in an amount of 10 to 70 wt.% of the total fatty acid content. Instead, Melnick teaches the use of vegetable oil. As pointed out in the present application, vegetable oil contains no long-chain polyunsaturated fatty acids. (*See* pg. 4, lines 23-24 of the as-filed specification.) With respect to corn oil in particular, the preferred vegetable oil of Melnick, this point is confirmed by reference to the attached article entitled "Lexicon of Lipid Nutrition" by Beare-Rogers et al. On page 731 of this document shows that corn oil contains no long-chain polyunsaturated fatty acids having 20 or more carbons. As explained on page 1 of the subject application, the so-called long-chain polyunsaturated fatty acids having 20 or more carbon atoms would be depicted as ω -3 ω -6 type acids. In the "Lexicon of Lipid Nutrition" article, the nomenclature used is n-3 or n-6 rather than ω -3 ω -6. Thus, looking back at page 731, corn oil has no reported trace of long-chain polyunsaturated fatty acids having 20 or more carbons.

The Office Action, apparently acknowledging the absence of a sufficient amount of long-chain polyunsaturated fatty acids having 20 or more carbons in Melnick, suggests it would be obvious to use peanut oil rather than vegetable oil in Melnick. The Office Action cites the Swern article (Baileys) as apparently showing that peanut oil has the requisite long-chain polyunsaturated fatty acid content required by the claims. However, even if this asserted

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substitution is obvious (which finds no support in the record evidence), peanut oil does not contain the level of polyunsaturated fatty acids that the Office Action alleges. Instead, looking at page 733 of the “Lexicon of Lipid Nutrition” article, peanut oil, like corn oil, does not have any long-chain polyunsaturated fatty acids having 20 or more carbons (designated as C>20 and n-3 or n-6). This is not an inconsistency between the data in the Swern article and the “Lexicon of Lipid Nutrition” article. Rather, the confusion lies in the fact that Swern discusses polyunsaturated fatty acids, not long-chain polyunsaturated fatty acids having at least 20 carbon atoms. Thus, substitution of peanut oil for vegetable oil in Melnick would not cure the clear deficiency with respect to the long-chain polyunsaturated fatty acid level in Melnick.

With respect to claim 30, the claimed method includes the steps of separating only the egg oil component of the egg from the whole egg or egg yolk and replacing only the separated egg oil component of the egg with a fat or oil component. The egg oil component is the triglyceride fraction. (See pg. 6, line 4 of the as-filed specification.) The defatting method employed in Melnick is a conventional, solvent based extraction means. It is well-known in the art that this results in removal of not only the egg oil, but also most of the phospholipids. In fact, this is confirmed by the disclosure in Melnick which states that “The treatment of egg yolk solids with a non-polar solvent...extracts the triglycerides, cholesterol and, to some extent, the other lipid materials.” (Melnick, col. 5, lines 1-4.) Thus, Melnick fails to teach or suggest a method of separating only the egg oil component of the egg from the whole egg or egg yolk.

Therefore, the rejection of claims 21, 23-25, 28 and 30 under 35 U.S.C. §103(a) for obviousness over Melnick as further evidenced by Potter and Swern.

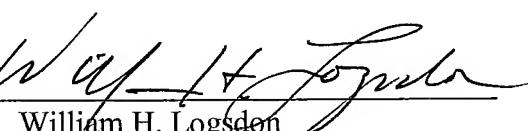
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CONCLUSION

For the foregoing reasons, Applicants respectfully submit that the pending claims are patentable over the cited art of record and are in condition for allowance. Accordingly, reconsideration of the outstanding rejections and allowance of pending claims 21, 23, 24, 26, 27 and 30 are respectfully requested.

Respectfully submitted,
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